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Master's Thesis

Domain Adaptation from Simulation to the Real World for Object Detection in Urban Scenes

In recent years the development of deep neural networks brought vast improvements in the field of object detection. However there is a downside, that large-scale labeled training datasets are needed to get a significant detection rate. The creation of this datasets is often prohibitively expensive and timeconsuming. To handle the limited amount of labeled training data, neural networks have been trained with synthetic data, given that the ground-truth annotation can be extracted automatically from the simulator. Afterwards the trained network have been applied to other sparsely labeled target domains. Unfortunately, the performance of a direct transfer across domains is poor, because of domain shift and dataset bias. Further researches in bridging this "reality gap" can enable the model to generalize better from a source domain to a target domain. This follows in a better detection rate in the target domain and a decreased need of hand labeled images.

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